

# Report for SPOKES Pipeline Run from October 7, 2013

October 7, 2013

## 1 Timings

SelectTargets	5.95 seconds	0MB
TileSurvey	115.60 seconds	0MB
AllocateFibers	4.59 seconds	0MB
CalculateThroughput	1.23 seconds	0MB
SimulateNoiseFreeGalaxySpectra	1.48 seconds	0MB
SimulateObservedGalaxySpectra	5.41 seconds	0MB
MeasureSpectroscopicRedshift	3.71 seconds	0MB

## 2 Tests

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## 3 SelectTargets

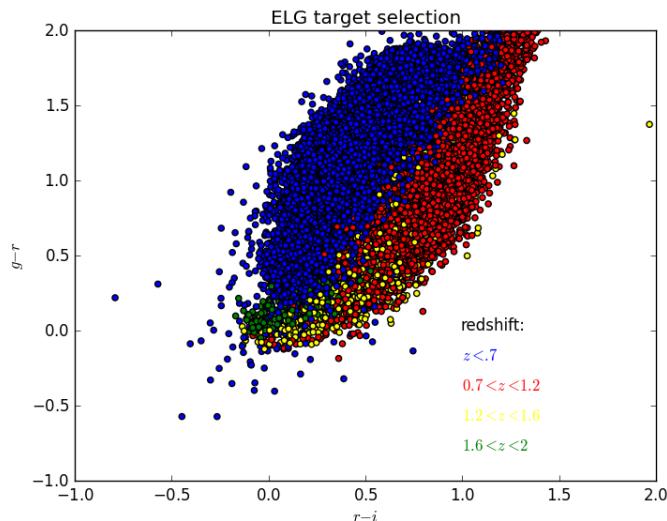


Figure 1: **SelectTargets** *ELGTargetSelectionScatterColorPlot.png*

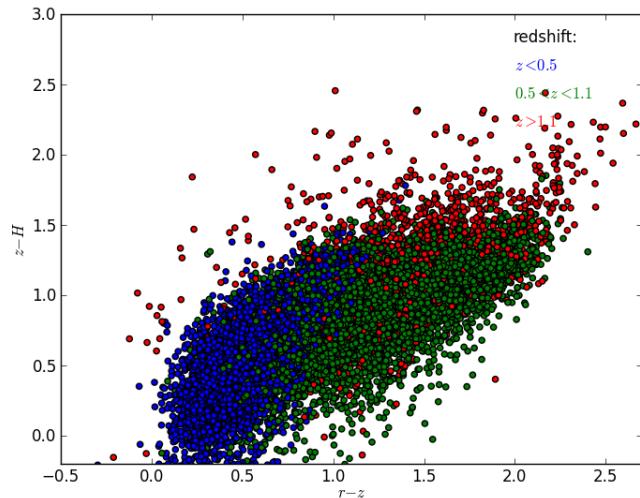


Figure 2: **SelectTargets** *LRGTargetSelectionScatterColorPlot.png*

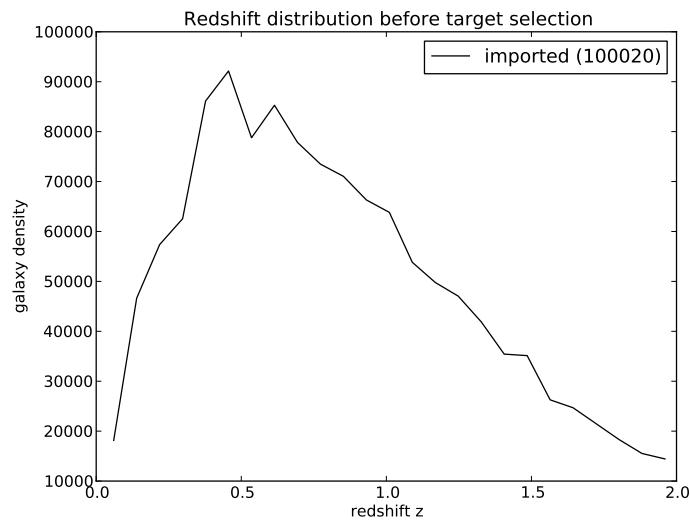


Figure 3: **SelectTargets** *redshiftDistributionBeforeTargetSelection.pdf*

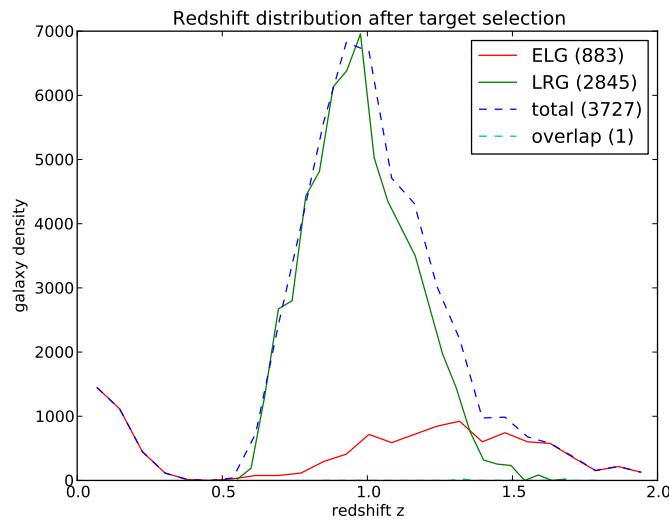


Figure 4: **SelectTargets** redshiftDistributionWithTargetSelection.pdf

```

ELG selected:    883
ELG discarded:   99137
LRG selected:    2845
LRG discarded:   97175
total selected:  3727
total discarded: 96293
undefined:        0
=====
total:            100020
*** checksum passed ***
*****

```

## 4 TileSurvey

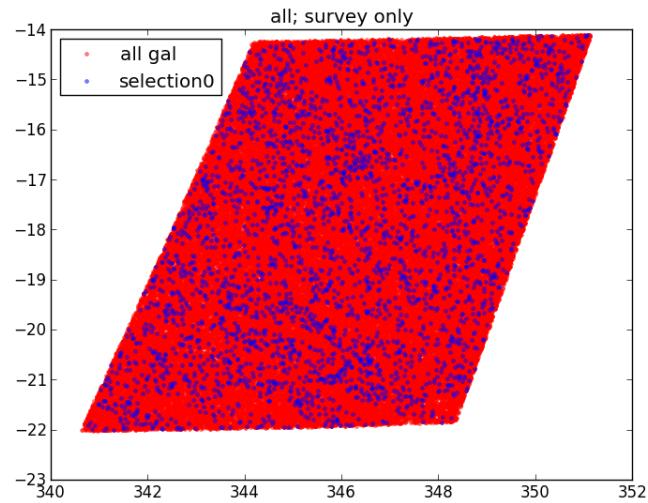


Figure 5: **TileSurvey** *gal\_ra\_dec\_0.png*

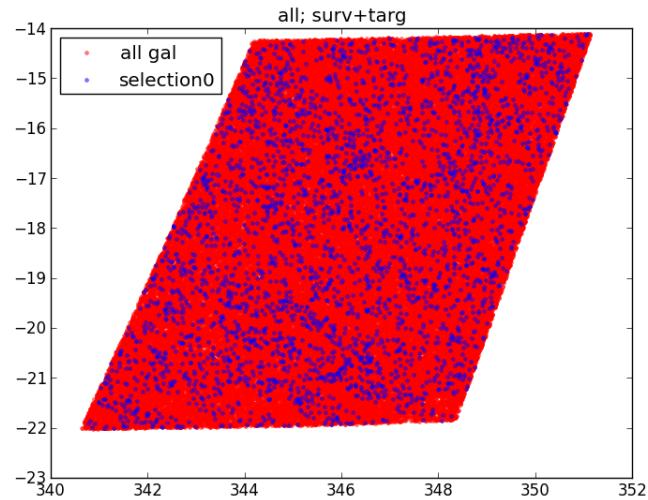


Figure 6: **TileSurvey** *gal\_ra\_dec\_1.png*

## Observation Analysis

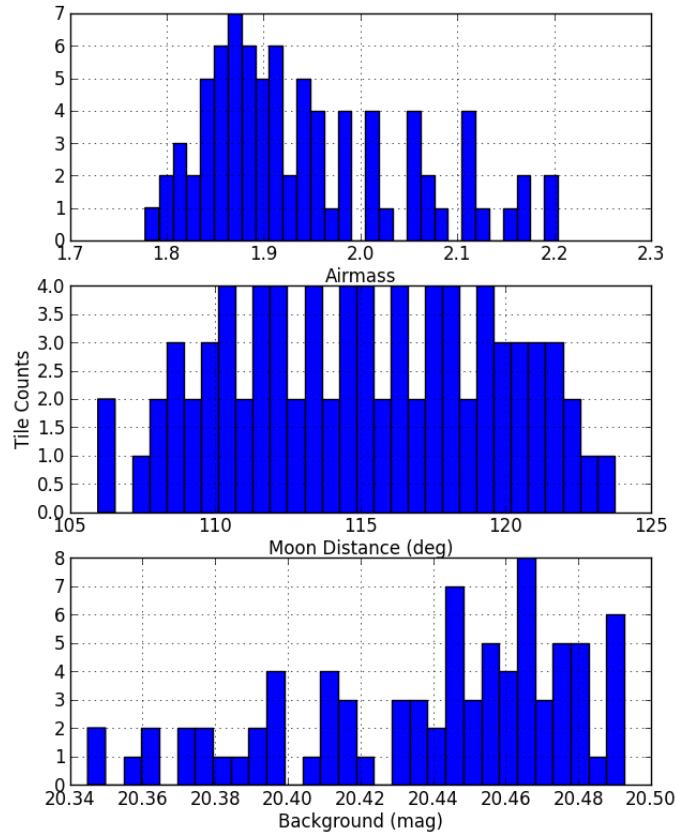


Figure 7: **TileSurvey** *meteo\_hists.png*

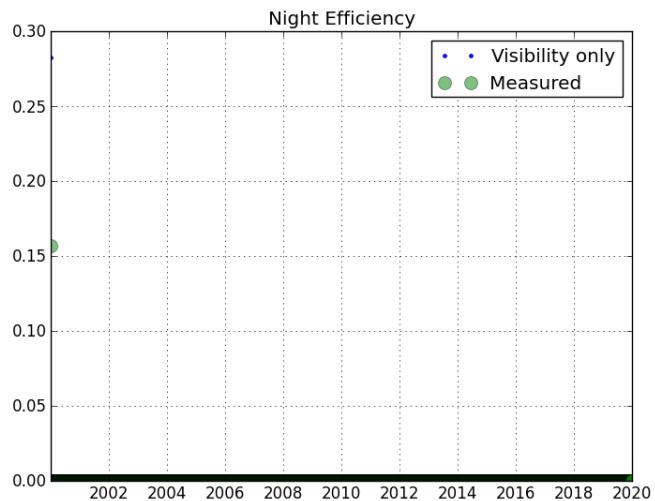


Figure 8: **TileSurvey** *night\_eff.png*

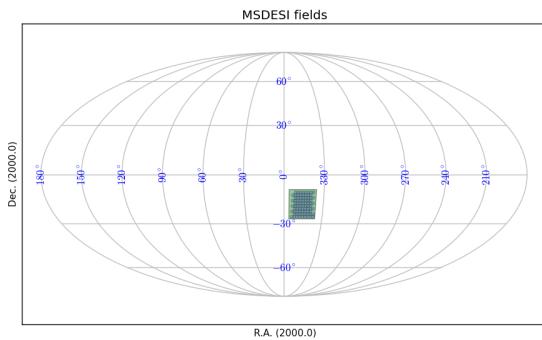


Figure 9: **TileSurvey** *planner\_all\_sky\_coverage.png*

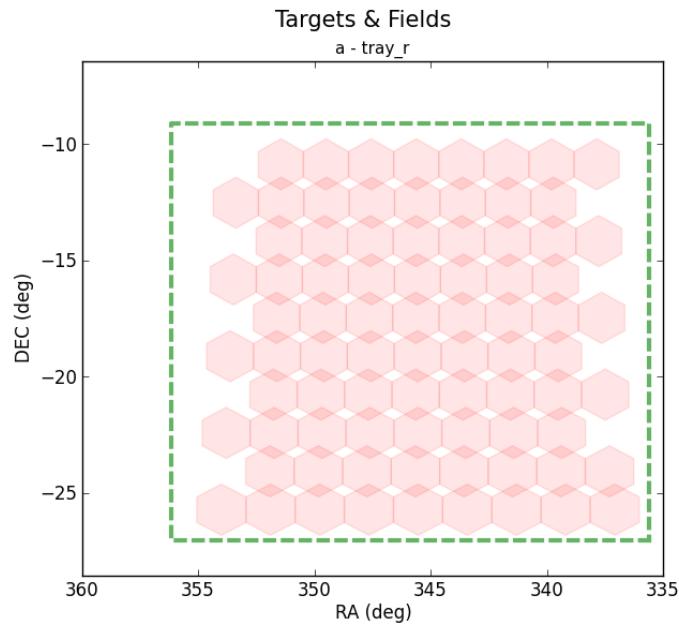


Figure 10: **TileSurvey** *planner\_fields\_coverage.png*

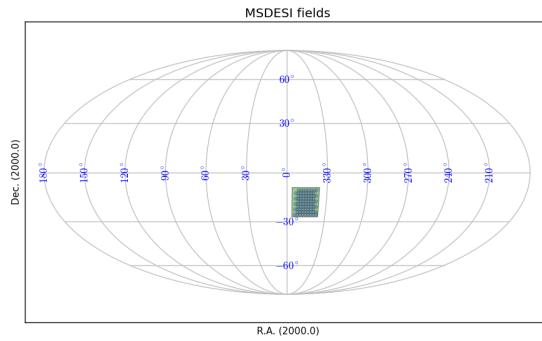


Figure 11: **TileSurvey** *scheduler\_all\_sky\_coverage.png*

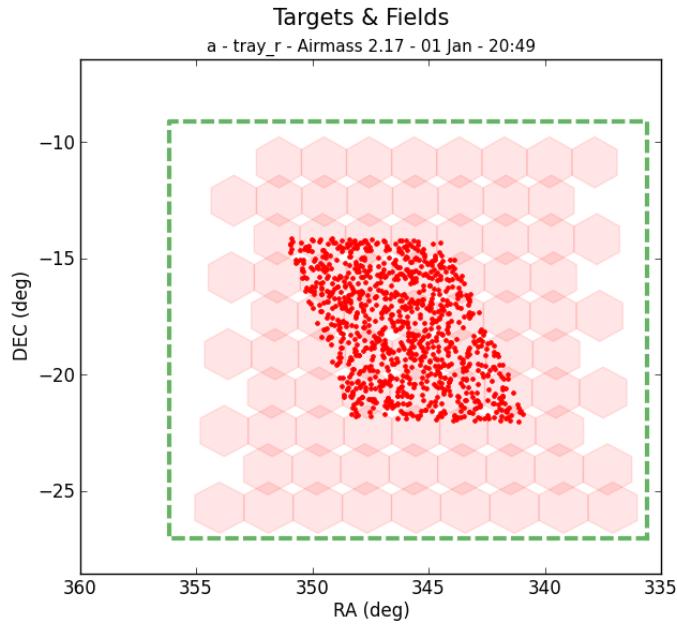


Figure 12: **TileSurvey** *scheduler\_fields\_coverage.png*

```
TotalNumber of tiles (with and without gals):81
```

```
Galaxies survey selected: 3247
```

```
Galaxies survey and target selected: 3727
```

```
... Area:
```

```
... ... all tiles, not combined: 6.28734443148
```

```
... Mean spatial density (via union of tiles):
```

```
... ... ELG: survey and target selected; only observed tiles: 245.890775804 galaxies//deg2
```

```
... ... LRG: survey and target selected; only observed tiles: 787.295821622 galaxies//deg2
```

## 5 AllocateFibers

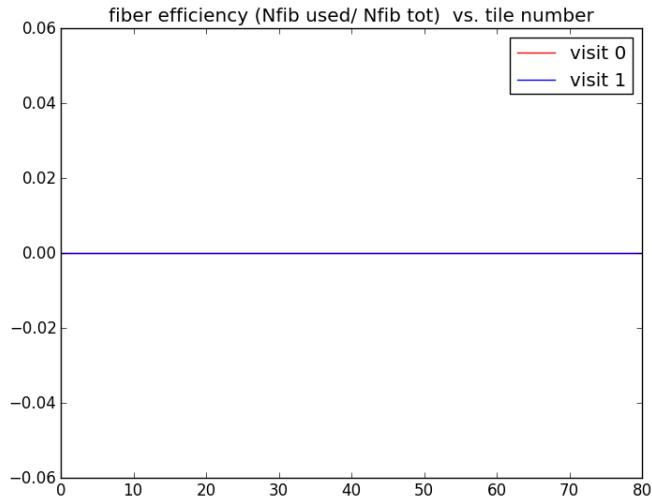


Figure 13: **AllocateFibers** *fiber\_efficiency\_fib.png*

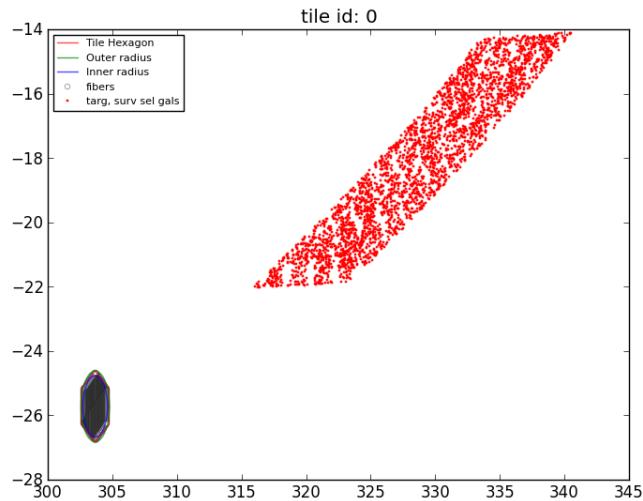


Figure 14: **AllocateFibers** *Tile\_t0\_v0.png*

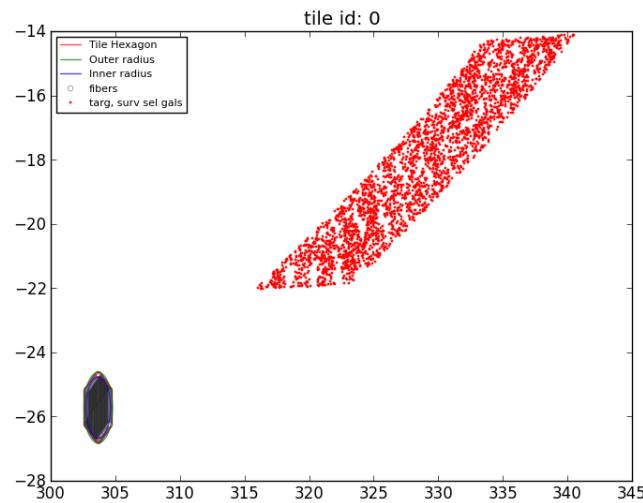


Figure 15: **AllocateFibers** *Tile\_t0\_v1.png*

number of target + survey + fiber selected0

## 6 CalculateThroughput

## 7 SimulateNoiseFreeGalaxySpectra

## 8 SimulateObservedGalaxySpectra

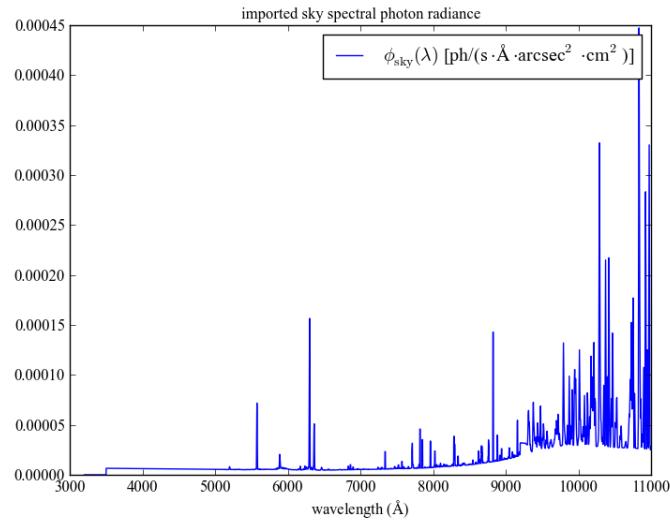


Figure 16: **SimulateObservedGalaxySpectra** *20\_sky\_spectral\_photon\_radiance.png*

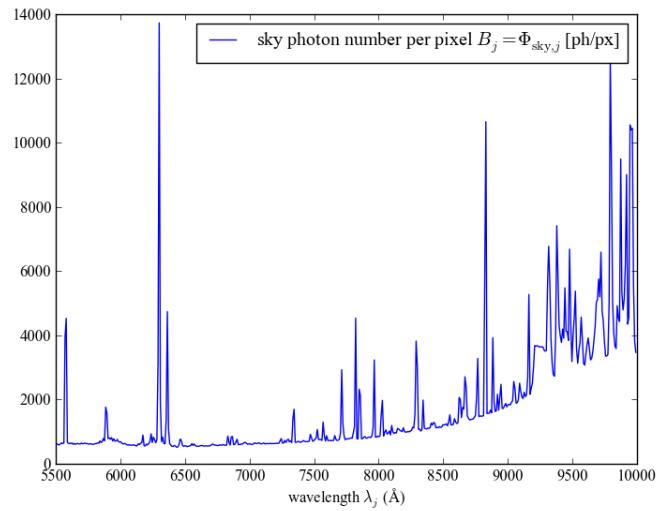


Figure 17: **SimulateObservedGalaxySpectra** 30\_B\_sky\_photon\_number.png

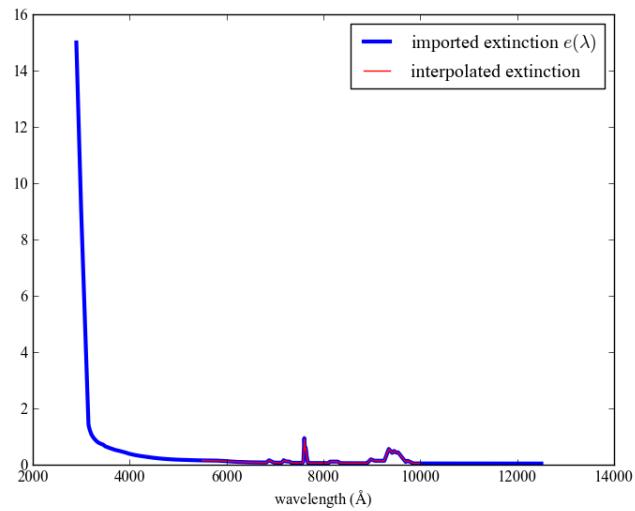


Figure 18: **SimulateObservedGalaxySpectra** 40\_extinction.png

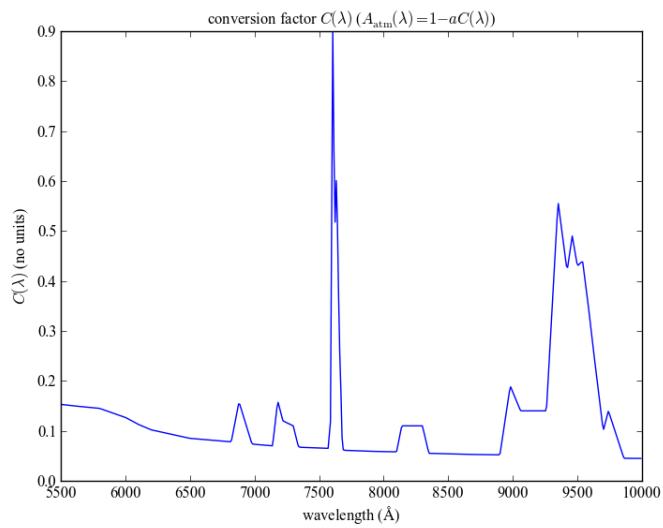


Figure 19: **SimulateObservedGalaxySpectra** 50\_C.png

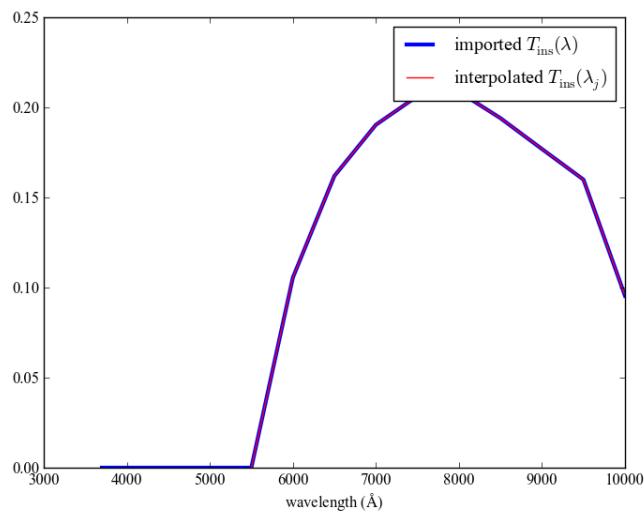


Figure 20: **SimulateObservedGalaxySpectra** 60\_instrument\_transmittance.png

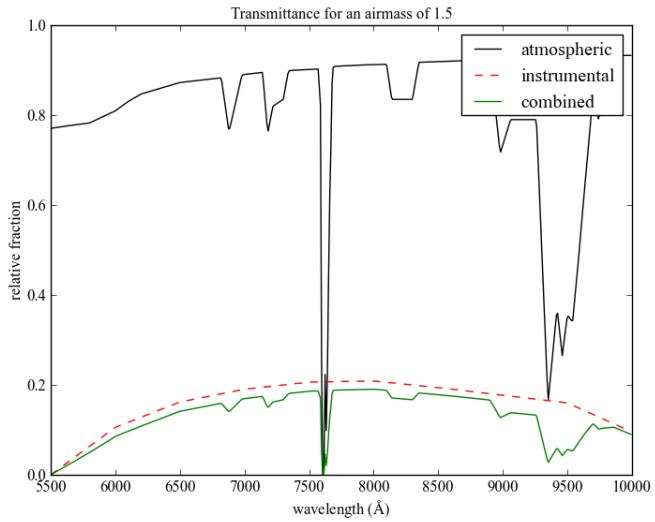


Figure 21: **SimulateObservedGalaxySpectra** *70\_transmittance\_instrument\_atmosphere.png*

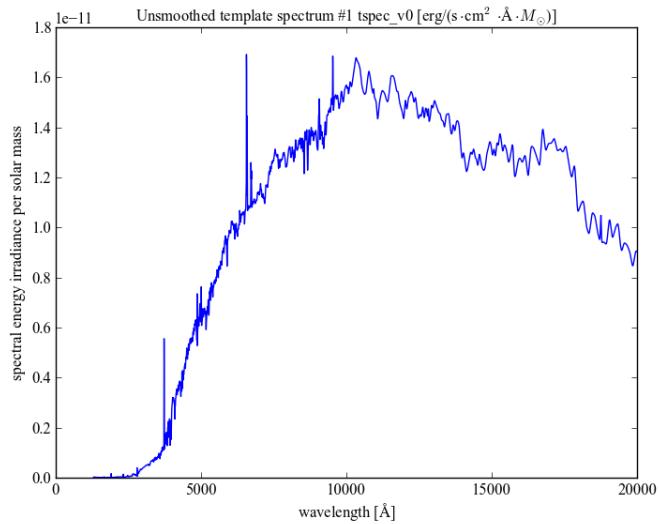


Figure 22: **SimulateObservedGalaxySpectra** *kcorrect\_templates\_v0\_1.png*

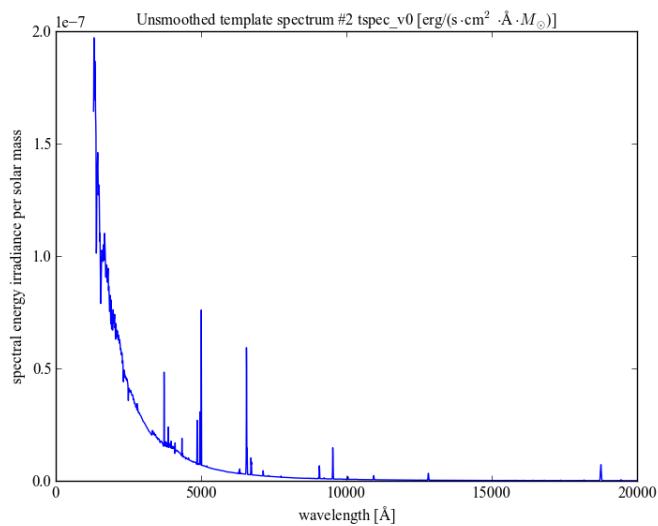


Figure 23: **SimulateObservedGalaxySpectra** *kcorrect\_templates\_v0\_2.png*

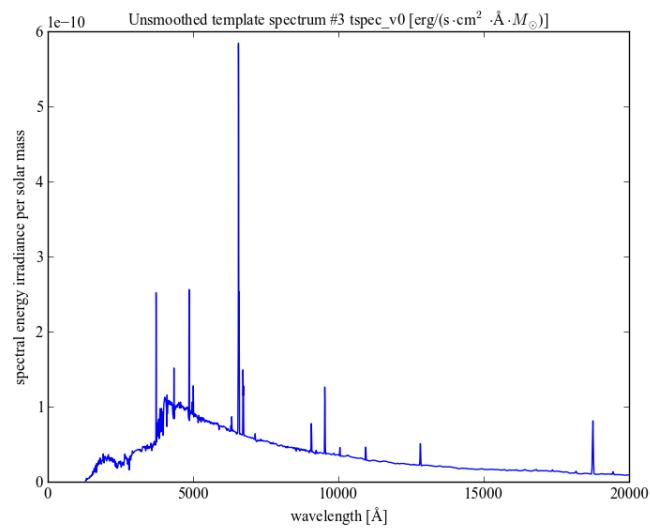


Figure 24: **SimulateObservedGalaxySpectra** *kcorrect\_templates\_v0\_3.png*

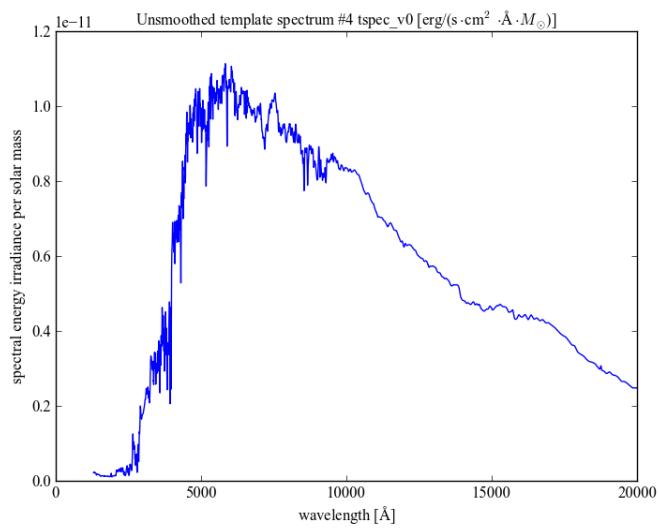


Figure 25: **SimulateObservedGalaxySpectra** *kcorrect\_templates\_v0\_4.png*

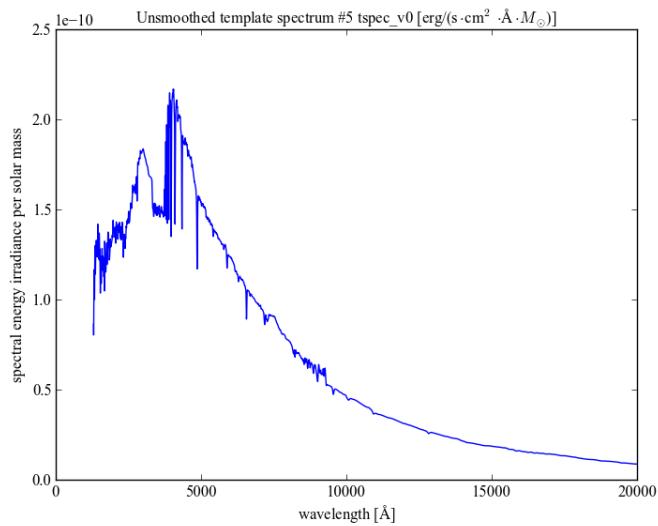


Figure 26: **SimulateObservedGalaxySpectra** *kcorrect\_templates\_v0\_5.png*

## 9 MeasureSpectroscopicRedshift

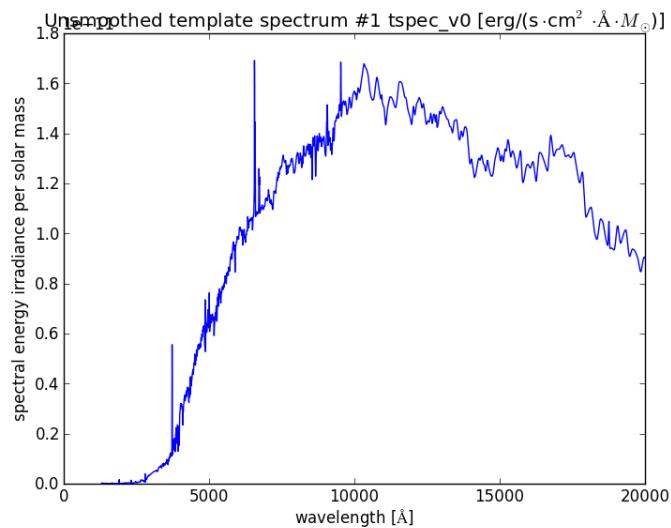


Figure 27: **MeasureSpectroscopicRedshift** *kcorrect\_templates\_v0\_1.png*

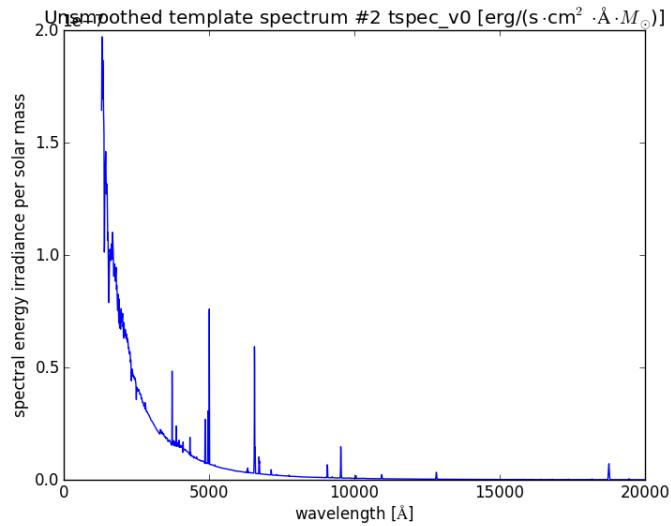


Figure 28: **MeasureSpectroscopicRedshift** *kcorrect\_templates\_v0\_2.png*

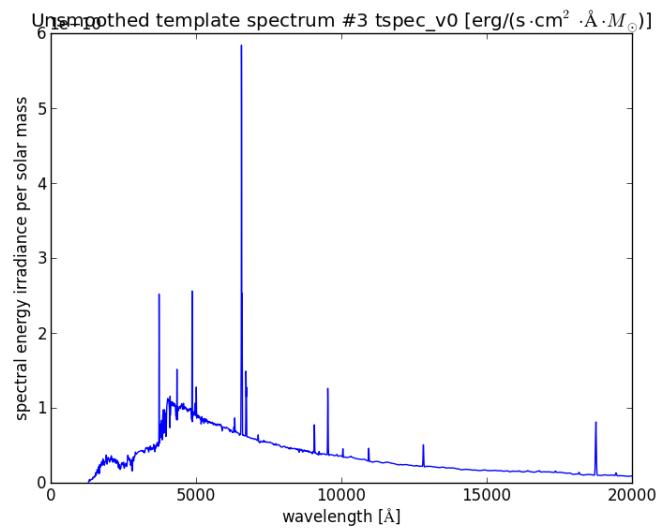


Figure 29: `MeasureSpectroscopicRedshift kcorrect_templates_v0_3.png`

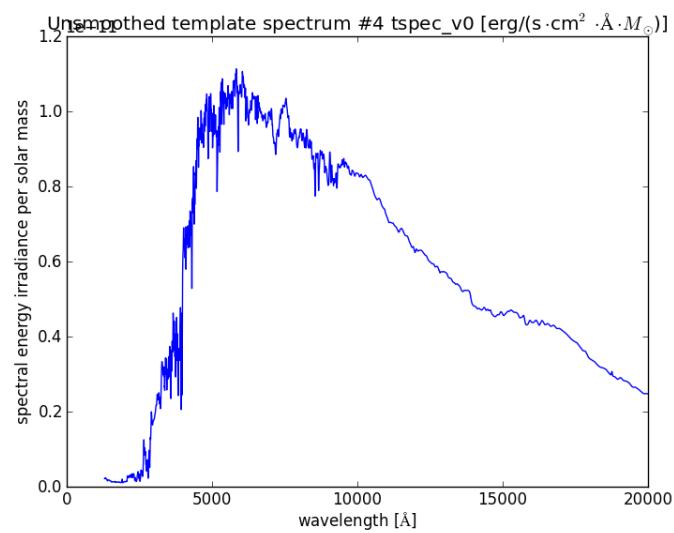


Figure 30: `MeasureSpectroscopicRedshift kcorrect_templates_v0_4.png`

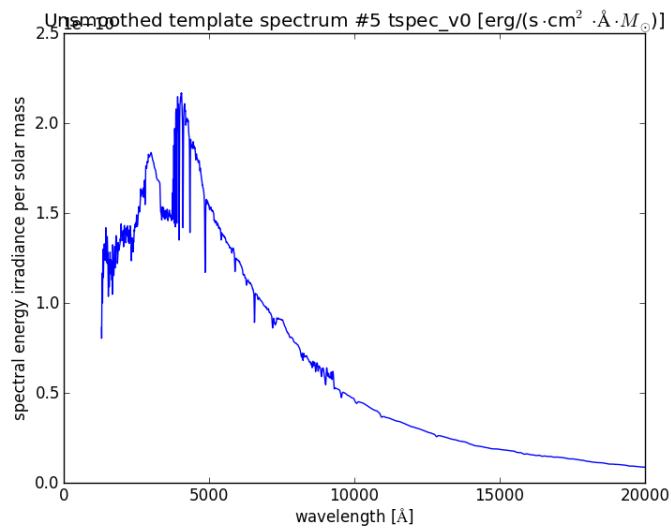


Figure 31: **MeasureSpectroscopicRedshift** *kcorrect\_templates\_v0\_5.png*

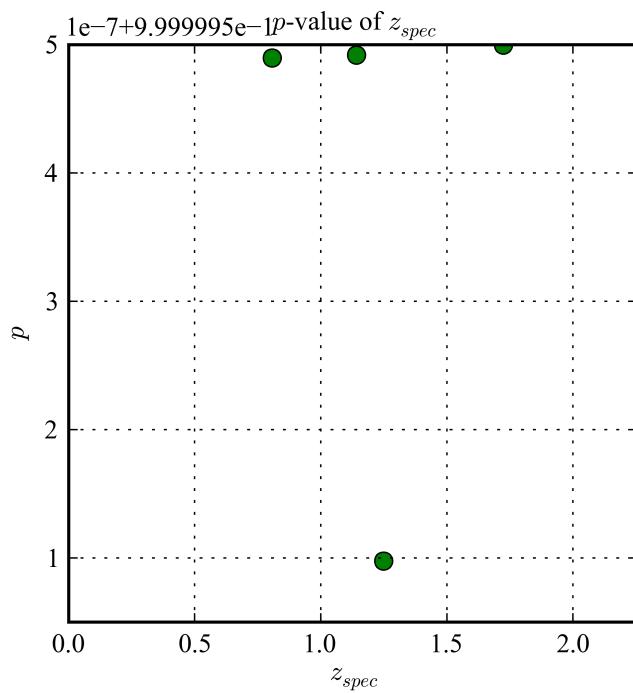


Figure 32: **MeasureSpectroscopicRedshift** *p\_value.png*

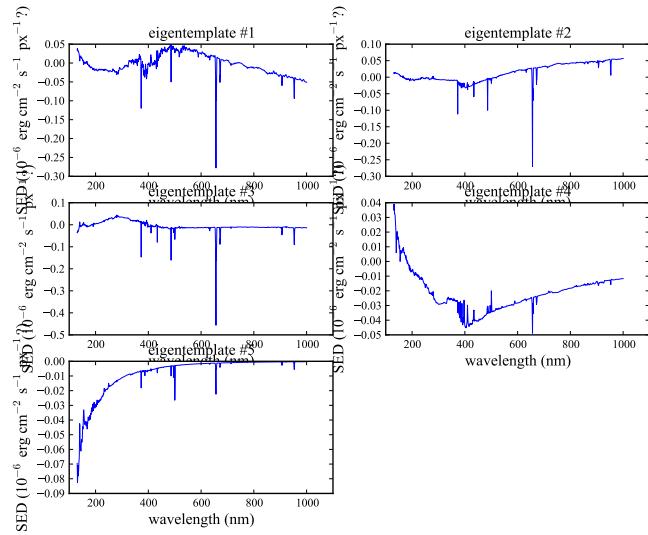


Figure 33: **MeasureSpectroscopicRedshift** eigentemplates.pdf

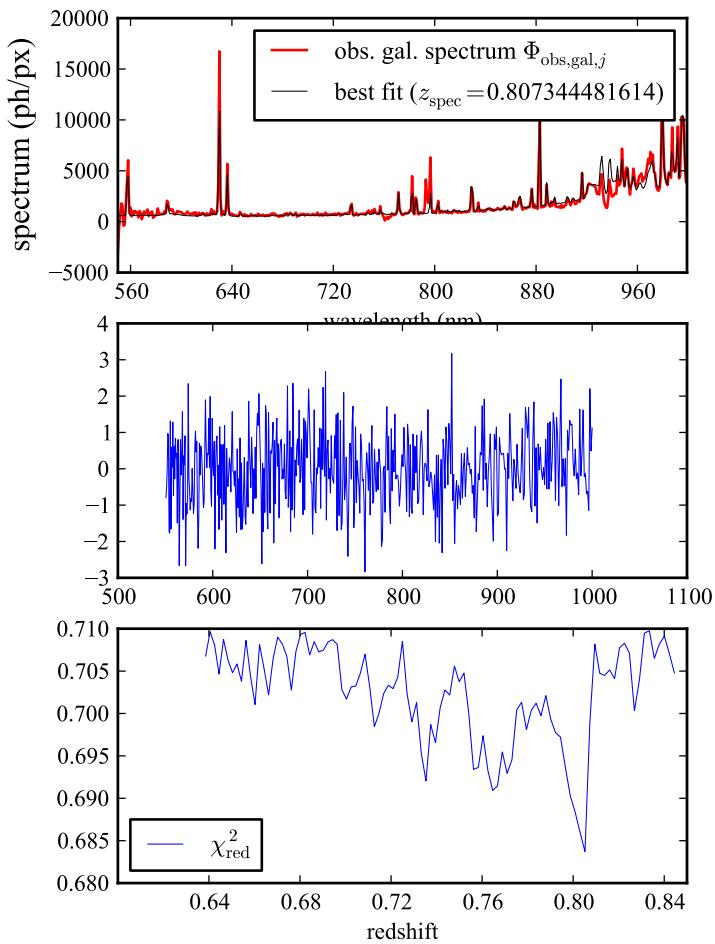


Figure 34: **MeasureSpectroscopicRedshift** spectrum\_1265542984.pdf

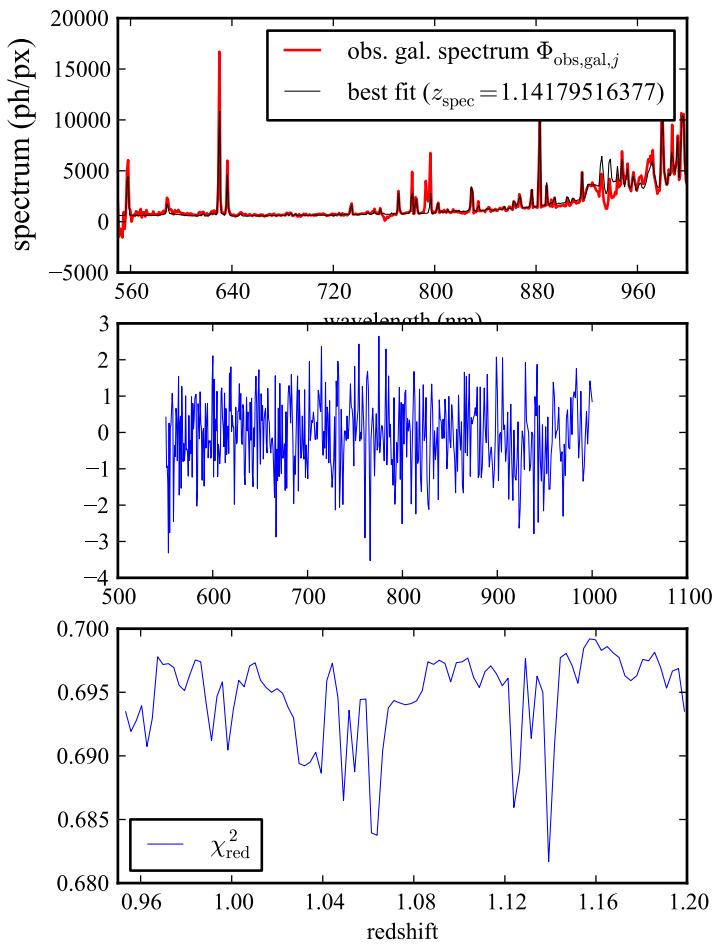


Figure 35: **MeasureSpectroscopicRedshift** spectrum\_2252866209.pdf

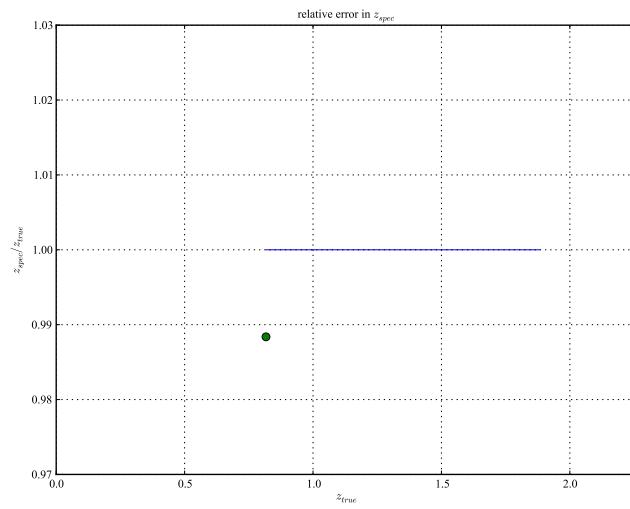


Figure 36: **MeasureSpectroscopicRedshift** zspec\_relative\_error.pdf

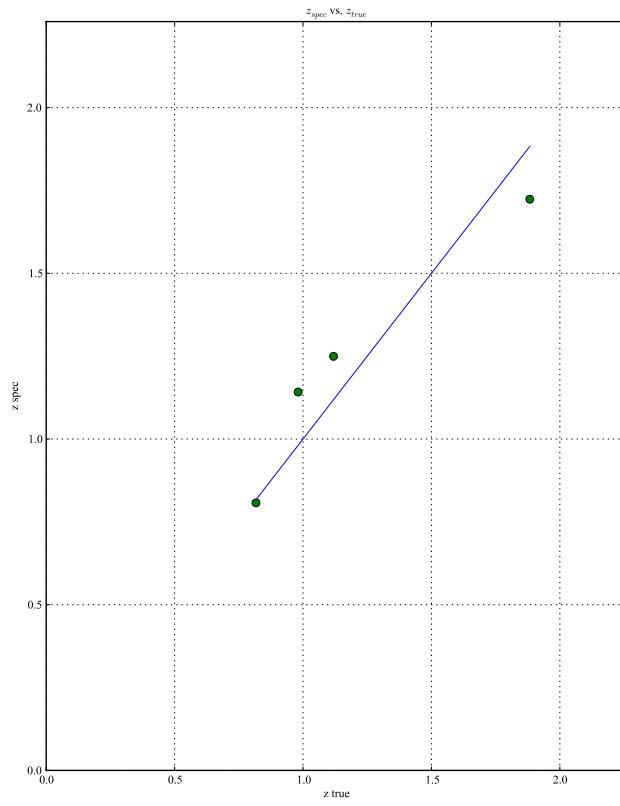


Figure 37: **MeasureSpectroscopicRedshift** zspec\_ztrue.pdf

## 10 Parameters

/Analysis		
/Analysis/RedshiftBinning		
max_redshift	2	
nb_bins	5	
/Analysis/SelectionFunction		
delta_ztrue_resolution	1e-05	
ztrue_resolution	0.0001	
/Analysis/Spectroscopy		
min_template_wavelength	1299.99995835	
multiprocessing	False	
option_rest_frame	False	
option_scale_spectrum	flat_rescale	
smoothing_length	0.025	
use_true_redshift	False	
/Analysis/TargetSelection		
central_choice	1	
dummy_magcut_range	[0, 90]	
dummy_photozcut_range	[0, 10]	
elg_linear_cuts_coeffs	[-23.4, 0.0, 0.0, 1.0, 0.0, 0.0, 0.0, 0.0, 0.0], [0.1, 0.0,	
elg_linear_cuts_connector	intersection	
galaxy_type_choice	LRG	
lrg_linear_cuts_coeffs	[-22.0, 0.0, 0.0, 0.0, 0.0, 1.0, 0.0, 0.0, 0.0], [1.5, 0.0,	
lrg_linear_cuts_connector	intersection	
mass_range	[9000000000000.0, 200000000000000.0]	
z_range	[0.89, 0.9]	
/ConvertFormats		
center_selection	None	
coeff_catalog_filename	'.../..../data/Aardvark_v1.0.coeffs.86.fit'	
dtheta_selection	0.1	
extinction_filename	.../..../data/palomarextinct.dat	
import_training_catalog	False	
min_declination	False	
min_right_ascension	False	
nb_galaxies_imported	100000	
observed_catalog_filename	'.../..../data/Aardvark_v1.0b_des_rotated.86.fit'	
observed_catalog_vista_magnitudes_filename	'.../..../data/Aardvark_v1.0_viking_mag.86.fit'	
pipeline_yaml_file_name	./config/pipeline.yaml	
recreate_data_bank	True	
selection_type	random	
sidelength_selection	[1.0, 1.0]	
sky_background_filename	.../..../data/skybg_50_10.dat	
spectral_templates_filename	.../..../data/k_nmf_derived.newdefault.fits	
throughput_parameters_filename	.../..../data/parameters.h5	
truth_catalog_filename	'.../..../data/Aardvark_v1.0b_truth_des_rotated.86-	
/Environment		
/Environment/Atmosphere		
atmospheric_extinction	paloma	
sky_background	gemini	
weather_model		

/Generators	
/Generators/SimulateNoiseFreeGalaxySpectra	
h5path	/SimulateNoiseFreeGalaxySpectra/spectrum
modclass	SimulateNoiseFreeGalaxySpectra
modfile	SimulateNoiseFreeGalaxySpectra
modpath	..../05-SimulateNoiseFreeGalaxySpectra/SimulateNoiseF
/Generators/SimulateObservedGalaxySpectra	
h5path	/SimulateObservedGalaxySpectra/spectrum
modclass	SimulateObservedGalaxySpectra
modfile	SimulateObservedGalaxySpectra
modpath	..../06-SimulateObservedGalaxySpectra/SimulateObserve
/Instrument	
/Instrument/Fibers	
allocation_method	distance
center_x	0.0
center_y	0.0
fiber_arrangement	hexagonal
fiber_diameter	0.000333333333333
fiber_size	0.05
keep_fraction	1.0
lrg_fraction	1.0
nb_fibers	4000
nb_fibers_on_diameter	73
nb_passes_per_tile	2
patrol_radius	0.0292
pitch	0.0292
/Instrument/Spectrograph	
altitude	2635.0
grid_type	linear
nb_pixels	500
noextinct	0
nolines	0
read_noise	5
seed_constant	9999
vdisp	60.0
wavelength_range	[5.5e-07, 1e-06]
worsening	1
/Instrument/Telescope	
diameter	4.0
optical_efficiency	0.25
throughput_file_name	..../data/desi-throughput.txt
use_throughput_file	False
/PhysicalConstants	
plancks_constant	6.62607e-27
speed_of_light	2.9979e+18
/Plotting	
nb_galaxies_plotted	2
plot_image_file_type	png
show_plot	False
/Survey	
addmoon	True

airmass_max	4
airmassmax	5.0
ccd_gap	250
ccd_height	4176
ccd_ro	300
ccd_width	2048
choose_plot_gal	True
choose_plot_tile	True
choose_plot_union	True
controlplots	SAVE
date_end	2019.03.01
date_start	2018.09.01
dbcreate	True
dbname	despecdb
dbpath	./Figures
dec_max	-18.0
dec_min	-21.0
declination_range	[0, 10]
duration	500
exposure_delay	30
exposure_time	90
exposuredelay	20
fieldcoord	None
fieldcoord_auto	[[335.6206359863281, 356.15582275390625, -27.019163131713867
fieldname	None
filtertraydelay	10
filtertrays	['tray_r']
followupfile	des.targets
hexagon_radius	1.1
include_moon_time	True
keep_fraction	1.0
location_alt	1700
location_lat	0
location_lon	0
loglevelfile	INFO
loglevelscreen	INFO
loglevelsq1	WARNING
logpath	Default
mag_incr_back	24
maxbackgroundincrement	2.5
nb_tiles	100
nbias	0
nflats	0
ngal_goal	5000000
ngal_overplot_projection	1000
ngal_overplot_tile	1000
ngal_overplot_union	1000
nights	['2000/1/1-2020/1/1']
npasses	1
num_bias_frame	0
num_flat_frame	0

onlyvisibility	False
overlap_percentage	100.0
pipeline	[]
planmode	SELF
plot_image_file_type	png
projectname	DES
ra_max	348.0
ra_min	343.0
right_ascension_range	[0, 10]
seed_constant	9999
seeing_mean	1
seeing_sigma	0.25
seeingmean	0.8
seeingsigma	0.1
simulationname	MSDESI_SS
start_margin_deg	0.1
survey_area	50
survey_area_goal	5000.0
telescopeheight	2207.0
telescopelatitude	00:00:00.0
telescopelongitude	00:00:00.0
time_after_dusk	8
timelimit	0
using_sim_actual	False
verbose	False
workingpath	./Figures
<b>/Throughput</b>	
collimator_fnumber	3.0
<b>/Throughput/parameters</b>	
AI	[ 0.921 0.92 0.919 0.918 0.916 0.916 0.912 0.906 0.
B270_6mm	[ 0.91135008 0.96407806 0.99131668 0.99314426 0.99756411
B270_air_glass	[ 0.831 0.88 0.906 0.909 0.914 0.915 0.915 0.915 0.
LLF1	[ 0.95 0.97 0.99 0.989884 0.992 0.993708
abs_tell	[0.94, 0.957, 0.959, 0.946, 0.973, 0.943, 0.935, 0.97, 0.962
ag_a	[ 0.98 0.985 0.988 0.988 0.985 0.98 0.975 0.
ag_b	[ 0.95 0.97 0.98 0.98 0.96 0.96 0.98 0.99 0.99 0.99
air_Bk7	[ 0.9549 0.9554 0.956 0.9567 0.9572 0.9576 0.9579 0.
air_silica	[ 0.958 0.958 0.959 0.959 0.959 0.96 0.96 0.96 0.
aperture_losses_gal	[ 0.449 0.465 0.49 0.521 0.544 0.566 0.581 0.59 0.
aperture_losses_star	[ 0.533 0.555 0.59 0.634 0.667 0.699 0.721 0.733 0.
bk7_25mm	[ 0.92 0.956 0.992 0.992596 0.994002 0.996027
blue_MgF	[ 0.975 0.979 0.981 0.982 0.981 0.979 0.978 0.976 0.
blue_broad	[ 0.991 0.998 0.998 0.997 0.998 0.998 0.996 0.987 0.
camera	[ 0. 0. 0. 0. 0. 0.87 0.91 0.92 0.94 0.94
ccd	[ 0. 0. 0. 0. 0.7 0.8 0.86 0.9 0.93 0.96
collimator	[ 0.92 0.96 0.97 0.98 0.98 0.98 0.98 0.98 0.97
ctio	[ 0.564 0.46 0.365 0.247 0.183 0.158 0.148 0.118 0.
dw	[2.552999999999836, 0.4969999999993888, 0.3930000000000291,
edmond	[ 0.94 0.985 0.988 0.994 0.988 0.9925 0.994 0.
fiber_material	[ 93. 65. 38. 25. 17.5 12.5 9. 7.75 7
fk5	[ 0.996 0.996 0.997 0.998 0.998 0.998 0.998 0.998 0.

laf21	[ 0.48 0.8 0.95 0.987 0.995 0.998 0.998 0.998 0.
lak33	[ 0.69 0.86 0.963 0.99 0.996 0.996 0.996 0.996 0.
lf5	[ 0.89 0.961 0.992 0.995 0.996 0.997 0.998 0.998 0.
mohawk_frd	[ 0.85 0.85 0.85 0.85 0.85 0.85 0.85 0.85 0.85
prot_ag	[ 0.9 0.92 0.93 0.96 0.975 0.98 0.98 0.98 0.
red_MgF	[ 0.954 0.955 0.959 0.967 0.973 0.978 0.981 0.982 0.
red_broad	[ 0.959 0.925 0.852 0.869 0.952 0.993 0.998 0.998 0.
seso_a	[ 19. 7. 3. 11. 9. 7.5 8. 12. 15. 16.
seso_b	[ 0.981 0.993 0.997 0.989 0.991 0.9925 0.992 0.
sf5	[ 0.63 0.91 0.98 0.994 0.997 0.998 0.998 0.998 0.
solgel_b	[ 0.985 0.99 0.993 0.995 0.994 0.992 0.989 0.986 0.
solgel_plus	[ 0.986 0.99 0.991 0.989 0.987 0.987 0.989 0.99 0.
solgel_r	[ 0.954 0.956 0.962 0.973 0.983 0.989 0.993 0.995 0.
vph_gsolver	[ 0. 0. 0. 0. 0.45 0.64 0.8 0.89 0.92 0.92
wabs	[5888.303, 5893.256, 5894.006, 5899.771, 5900.629, 5901.62,
wavelength	[370.0, 400.0, 450.0, 500.0, 550.0, 600.0, 650.0, 700.0, 750
wavelength_a	[5887.013, 5893.029, 5893.806, 5899.555, 5900.457, 5901.351,
wavelength_b	[5889.566, 5893.526, 5894.199, 5899.97, 5900.788, 5901.827,
throughput	[ 0. 0. 0. 0. 0.